IN THE SPECIFICATION (as originally filed):

Page 1, immediately following the title, please insert the following:

This is the U.S. national phase of International Application No. PCT/DE03/02476 filed July 22, 2003, the entire disclosure of which is incorporated herein by reference.

~~Description~~ BACKGROUND

Field of the Disclosure

The paragraphs beginning on page 1, line 4 have been changed as follows:

The ~~present invention~~ disclosure concerns a pore burner, especially for cooking appliances, with a housing having at least one inlet for gas/air mixture as fuel and/or at least one inlet for air and/or at least one inlet for gas and/or at least one outlet for air and/or gas and/or exhaust, as well as a cooking appliance containing at least one pore burner.

The ~~invention~~ disclosure also concerns a pore burner system, as well as the use of pore burners and pore burner systems for heat and/or steam generation in cooking appliances and heating appliances, as well as finally these cooking and heating appliances.

On page 1, after line 10 please add a heading as follows:

Related Technology

The paragraph beginning on page 2, line 8 has been changed as follows:

In the pore burners known from the prior art ~~just~~ described above, the reactions between the combustion gas and the oxidizing agent underlying flame formation generally occur mostly or fully within the porous matrix. The hot reaction products therefore emerge from the burner cavities without flame formation. This procedure means that flames are cooled by the burner material, which helps to prevent further flame propagation as well as flashback. However, if the burner masses and burner loads are chosen very small, flashback can occur. For example, this is regularly the case, if high temperatures are present in compact heating appliances because of high surrounding temperatures even in the combustion chamber itself. Flashback can often be reached merely because of sufficient flame cooling. However,

a large mass with high heat capacity and good thermal conductivity is required for this. Another common feature of the described pore burner devices is that optimized gas homogenization and gas distribution over the burner surface, as well as sufficient flame stability as well as shape stability of the surface are regularly achieved only by using several components of different geometries and/or materials.

On page 2, after line 26 please insert the following:

Netherlands patent NL 103 250 C2 describes a pore burner with a housing, which has an inlet for a gas/air mixture as fuel. The pore burner housing is formed of sintered metal powder in the form of a porous molded element. This molded element is composed of several rectangular combustion chamber elements, which are held together by two longish, opposing fastening strips. In this way, especially good sealing between adjacent chambers can be achieved.

The paragraph beginning on page 3, line 1 has been change as follows:

Ordinary fully premixing burners, especially flat burners and flat flame burners have thus far generally been made from sheet metal provided with holes and/or slit patterns, for example, as known for burners in cylindrical combustion chambers. For roughly homogeneous distribution of the gas mixture, additional sheets are also required with a coarser perforation, which are situated beneath the aforementioned sheet. Only with these design stipulations is it possible to regularly adjust the flow rates so that the corresponding gas/air mixture can be fed to each site in the appropriate amount. Known flat burners can also ~~consist of~~ include a flexible wire mesh, perforated ceramic or wire fabric fastened to a support structure. However, for gas homogenization and gas distribution as well as flame stability and shape stability of the surface, the combination of several components of different geometries and materials is always required.

On page 4, after line 3 please insert a heading as follows:

GENERAL DESCRIPTION

The paragraphs beginning on page 4, line 4 have been changed as follows:

The task underlying the ~~present invention~~ disclosure was therefore to make pore burners available for cooking appliances in particular and to modify the generic pore burners so that they are no longer burdened with the drawbacks of the generic pore burners and, in particular, have a high degree of flame stability and homogeneity, especially when designed as flat burners or flat flame burners. Accordingly, another underlying task of the ~~present invention~~ disclosure was to modify a generic cooking appliance so that it can be heated with high energy efficiency constantly and efficiently from an ecological standpoint with the lowest possible operating costs. Finally, another task underlying the ~~present invention~~ disclosure was to furnish a pore burner that guarantees improved ignition regardless of the energy content of the fuel mixture or the condition of the pore burner and helps to avoid delayed ignition.

This task is solved according to the ~~invention~~ disclosure by pore burners with a housing having sintered metal powder and/or especially pressed metal wire mesh in the form of at least one shape-stable, porous molded element, on whose surface and/or in whose pore spaces reaction zones for flame development are present to form a flat burner wherein the molded body includes at least one mounting and/or fastening element incorporated in it as integral component of this molded element. Accordingly, the entire molded element surface can also represent the outlet of the pore burner ~~according to the invention~~, because of the porous structure and optionally also without a defined, large-surface outlet, for example, on one end of the housing. The pore burner according to the ~~invention regularly~~ disclosure ordinarily has at least one inlet for a gas/air mixture as fuel. In addition or as an alternative, the pore burner or housing of the pore burner can have at least one additional inlet for air and/or an additional inlet for gas. For example, separately supplied air can be used as secondary air or also for the cooling of components of the pore burner. So-called fully premixing burner systems are preferably used ~~preferably~~, especially in cooking appliances.

The pore burner ~~according to~~ of the ~~invention~~ disclosure can be used, for example, for heat and/or steam generation in cooking appliances, especially gas-heated cooking appliances and also in heating appliances, like heating vessels or gas

heating appliances, for example, in the household, especially when using cylindrical combustion chambers.

The pore burners ~~according to~~ of the ~~invention~~ disclosure, used in cooking appliances, for example, can represent partially premixing and especially fully premixing pore burners. In this case the burners can be a cylindrical tube preferably closed on one end. The application of gas outlet openings distributed on the periphery of the tube has also been shown to work.

~~It can be prescribed according to the invention that the~~ The molded element can be an essentially hollow element, especially a hollow cylinder. Appropriate hollow elements can also have arbitrary geometric shapes, for example, an ellipse, triangle, square, rectangle or any polygon in cross section. Appropriate hollow elements can also fully dispense with a defined, large-surface outlet opening and be designed, for example, as an ellipse, sphere or cylinder with only at least one defined opening for inlet of the gas/air mixture. By using hollow elements it is possible in a simple manner to create the largest possible surface for a uniform flame front.

It ~~has turned out to be~~ is very advantageous that pore burners are accessible, in which the molded elements include at least one mounting and/or fastening element, especially a groove, a tongue, a flange, and/or a thread. Mounting and fastening elements can be integrated with the pore burners ~~according to the invention~~ already in the shape-stable molded elements, for example, from pressed metal wire mesh, so that the production costs of the pore burner ~~according to the invention~~ can be reduced and production for large series can be implemented much more easily. Naturally, the shape-stable molded element can also be simply welded on for fastening, for example, on the tube to supply the fuel mixture. This can be achieved in particularly simple fashion, if both the tube and the shape-stable molded element have corresponding cross-sections and the molded element is configured cylindrical and the tube has a circular cross-section.

Particular advantages with respect to handling and minimization of components are obtained ~~by the fact that~~ when the mounting and fastening device is incorporated directly in the porous molded element material of the pore burner. For example, a thread can be made in the pore element. Consequently, no additional mounting or fastening devices and no joining technique for coupling to the pore burner are required.

According to another aspect of the ~~invention~~ disclosure, pore burners containing at least two molded elements lying one against the other in shape-mated fashion at least in sections are present, which are connected to each other in areas, preferably to form a groove. By combining shape-stable molded elements in shape-mated fashion, large-dimensioned pore burners can also be made without having to tolerate drawbacks with respect to uniform gas passage or uniform flow profile. Two or more assembled molded elements can ~~enter into a stable connection~~ be stably connected via a bevel or groove. It is particularly advantageous if the adjacent molded elements can be joined or inserted one in the other flush and firmly, for example, via a groove/tongue structure, without requiring additional fastening devices. However, it can be necessary to permanently fasten coupled molded elements by means of spot welding. The molded elements are then preferably only joined together at very few adjacent sites and secured against loosening. A constant material density therefore remains even in the region of joints so that a uniform flow profile is guaranteed. To the extent that in very large molded elements of the aforementioned type high homogeneity of the porous material and therefore the most uniform possible flow profile cannot always be maintained, with the variant just described pore burners of larger size become accessible, which have an extremely uniform flow profile over their entire burner surface. In a preferred variant, the shape-stable molded elements, especially hollow elements, are designed in their end regions or head surfaces so that they correspond to each other in shape so that the front region of one molded element is inserted to fit in the rear region of another molded element, especially one of identical design. Pore burners can therefore be obtained that can be arbitrarily extended in length without having to tolerate the drawbacks with respect to homogeneity.

~~It has therefore turned out to be~~ It is particularly advantageous ~~that~~ if the pore burner ~~according to the invention can be~~ is converted as such to a stable shape or ~~be~~ is present in a stable shape configured so that two or more such pore burners can be connected to each other. For example, adjacent pore burner segments to be connected to each other can be configured on their sections being coupled so that they can be inserted one into the other without requiring additional fastening devices. According to one variant, for example, the open end section of one pore burner segment can be provided with at least one groove that can be connected to fit with an end section of an adjacent pore burner segment provided with at least one tongue. The shape

stability of the employed pore burners is then already achieved during production by sintering of metal powder and pressing of metal wire mesh without requiring additional mechanical support elements. Naturally it is possible to couple not only two pore burners via groove/tongue elements corresponding to each other, but three or more pore burners or pore burner segments can be coupled to each other by means of the aforementioned joining technique to form a uniform pore burner. The end piece of this combined pore burner then preferably has a closure, for example, in the form of porous burner material so that the pore burner has no outlet opening. A one-piece pore burner, like a pore burner segment, can be configured both cylindrically and conically. The same applies to a pore burner formed from several pore burner segments. The pore burner then preferably tapers in the direction toward the end.

It ~~can be prescribed according to the invention that~~ is advantageous if the material densities of at least two adjacent molded elements essentially correspond.

The paragraph beginning on page 7, line 4 has been changed as follows:

~~Another~~ In another embodiment ~~according to the invention is characterized by the fact that~~ the surface of the molded element has at least one irregularity, especially at least one indentation and/or elevation that deviates from the base surface of the molded element.

The paragraph beginning on page 7, line 19 has been changed as follows:

Preferred pore burners ~~according to the present invention~~ are flat flame burners.

The paragraphs beginning on page 8, line 10 have been changed as follows:

Pore burners according to the invention containing metal wire meshes accordingly also have, advantageously, ~~1~~ one to ~~5~~ five, especially ~~1, 2 or 3~~ one, two, or three metal wires.

It ~~can then be prescribed according to the invention that~~ is advantageous if the metal wire mesh be axially or radially wound before pressing.

Pore burners ~~according to the present invention~~ are also preferred with which surface loads in the range from 20 to 300 W/cm^2, especially from 30 to 260 W/cm^2 are accessible. Accordingly, in the pore burners ~~according to the invention~~ it is preferred that the flame does not go out even at 200 W/cm^2 or more. The maximum

surface load is then often restricted not by the wire mesh but by the feed power of the air and/or gas feed. The surface load lower limit is regularly formed by the fact that the flame is extinguished as a result of high heat conduction on contact with the metal surface. With a three-wire metal mesh based on a heat-resistant steel, for example, 1.4828, with a compressed density of about 3.8 g/m^3, surface loads in the range from about 30 to 160 W/cm^3 can be achieved without difficulty. The pore burner ~~according to the invention~~ therefore permits a very broad range of possible operating states between flame extinction on the one hand and flame raising on the other, and therefore also a power modulation range of 1:5 or more. For example, at a surface load of about 70 W/cm^2 with an air ratio of about $\lambda = 1.2$ an incandescent wire mesh is obtained. During a reduction in air ratio, incandescence will occur at higher powers and at higher air ratios the surface only radiates at very low power. With increasingly more intense incandescence, the percentage of heat transported by radiation from the reaction zone becomes increasingly larger.

It is proposed in another variant ~~according to the invention~~ that the metal powder and/or metal wire mesh includes at least one metal and/or metal alloy that forms an oxide layer, especially a metal alloy containing chromium and/or aluminum. Heat-resistant materials, for example, heat-resistant steels, are considered appropriate metals and metal alloys for the metal powders being sintered and especially for the wire mesh. These include, for example, high-alloy steels, like low-carbon austenitic chromium, nickel and manganese steels. The heat-resistant steel 1.4828 (X15 CrNiSi 20-12) can be referred to as an example. Those metal or metal alloys that can form an oxide layer on their surface are also readily suited so that the molded articles can be provided with a protective layer. Particularly appropriate metal alloys have aluminum and/or chromium fractions or consist of these metals. An appropriate material, for example, is the alloy with material number 1.4767 (CrAl 20 5), as well as alloys with the material number 1.47675.

The task ~~underlying~~ <u>of</u> the ~~invention~~ <u>disclosure</u> is solved according to another aspect by a pore burner having at least one distribution device for deliberate alignment of one part of the gas and/or air stream and/or the gas/air mixture stream, which can be arranged and/or molded at least in sections in the hollow element of the pore burner, so that part of the air and/or gas stream or the gas/air mixture stream can be distributed in a manner so that the inside wall of the hollow element experiences a

~~nonhomogeneous~~ non-homogeneous pressure distribution, especially in the region of the distribution device.

Whereas the gas/air mixture enters the cavity essentially uniformly in ordinary pore burner cavities, it is possible ~~in the device according to the invention~~ to deliberately divert part of the gas/air mixture stream to one region of the inside wall of the pore burner hollow element. The gas/air mixture is fed to this selected region on the inside wall with a stronger pressure than to the surrounding areas of the hollow element.

The paragraph beginning on page 9, line 23 has been changed as follows:

~~It can then be further prescribed that the~~ The distribution device can ~~includes~~ include essentially metallic and/or ceramic materials and ~~is~~ be made, for example, from stainless steel.

The paragraph beginning on page 10, line 16 has been changed as follows:

The pore burners ~~according to the invention~~ can also have at least one burner tube for air and/or gas that can be connected to an inlet of the pore burner. This burner tube is generally a component of the supply line.

The paragraphs beginning on page 10, line 21 have been changed as follows:

~~It can then be prescribed that the~~ The distribution device can be fastened at least in sections to the burner tube and/or hollow element. Generally it is sufficient if the distribution device is fastened via one or two spot welds on the inside of the burner tube. In this case it has proven advantageous, if the distribution device has no direct connection to the hollow element.

~~Another advantageous embodiment is characterized by the fact that the~~ The deflection surface of the distribution device, especially the baffle plate, ~~is~~ may be sloped relative to the center axis of the hollow element, especially of the hollow cylinder.

In principle, a slight slope, for example, of the baffle plate relative to the center axis of the hollow element is already sufficient to supply a selected region on the inside surface of the pore burner hollow element with the fuel mixture in a preferential fashion, i.e., with a higher pressure. Slope angles in the range from 10° to

45°, especially from 15° to 30° have proven to be particularly advantageous. The distribution device can naturally also have a blade shape or be bent.

The paragraphs beginning on page 11, line 11 have been changed as follows:

Another variant ~~according~~ of to the ~~invention~~ disclosed device has pore burner systems as object, which include at least one feed tube for air and/or gas, which can be connected to an inlet of the pore burner, and/or at least one ignition device.

~~It can then be prescribed according to the invention that at~~ At least one inlet of a shape-stable molded element can be connected via a mounting and/or fastening element, especially a flange and/or a thread, to at least one feed tube and/or burner tube for air and/or gas.

~~It can also be prescribed according to the invention that at least one inlet of a shape-stable molded element be at least partially welded to at least one feed tube and/or burner tube and/or gas.~~

~~It can also be prescribed according to the invention that the~~ The ignition device can be arranged in the region of the outside of the hollow element in the region on whose corresponding inside the distribution device has the smallest spacing. The ignition device, for example, ignition electrode, accordingly preferably lies where the diverted combustion gas mixture emerges from the pore burner wall so that the flame is regularly ignited with the first ignition spark. The reaction front continuously propagates afterward.

According to another aspect of the ~~present invention~~ disclosure, the task is also solved by a cooking appliance, especially a gas-heated cooking appliance containing at least one pore burner, especially a pore burner according to the invention or a pore burner system according to the invention. Those with closed and open systems are considered as cooking appliances. Gas-heated cooking appliances, especially those with a pore burner that functions as a flat burner or flat flame burner are preferably resorted to. The smallest cooking appliances, for example, kitchen cooking appliances can then also be equipped with pore burners, especially pore burners according to the invention just like large cooking appliances that are used in large kitchens, for example. Appropriate areas of application for the pore burners according to the invention include steam cooking appliances or also so-called Combi-steamers.

A very high degree of flame stability is achieved with the pore burners ~~according to~~ the ~~invention~~ disclosure. At the same time, flashback is essentially fully prevented. Pore burners are therefore provided with a porous material of high homogeneity and uniform flow profile that have a uniform and constant flame front as surface burners and are suitable in particular as flat flame burners. A quasi-two-dimensional flat flame is maintained over the entire burner surface with the pore burners ~~according to~~ of the ~~invention~~ disclosure. The cooking appliances ~~according to~~ of the ~~invention~~ disclosure have a very high efficiency and can be operated with exceptional ecological efficiency, for example, resource-sparing and low-pollution. The heat input is then very uniform and can also be precisely regulated and controlled directly and simply. The properties just described can also surprisingly be implemented with cooking appliances ~~according to~~ of the ~~invention~~ disclosure that are dimensioned small. The cooking appliances ~~according to the invention~~ can therefore be used both in large kitchens, for example, cafeteria operations, and also in restaurants and guest houses. Cooking appliances with flat burners accommodated in them are therefore accessible without difficulty.

~~The~~ It is surprising ~~finding~~ that by means of a distribution or guide device mounted in the internal space of a pore burner hollow element at least part of the introduced or blown-in gas/air mixture is deliberately fed to a specific region of the inside wall of this hollow element ~~also forms the basis of the present invention~~. In this way fuel supply can be reliably achieved, which is always sufficient to be ignited with an ignition spark. In particular, pore burners can be ignited without problem independently of their initial state and independently of the quality of the gas/air mixture. Because the gas/air mixture emerges outward within a defined region through the porous hollow element, the reaction can be started and also maintained via an ordinary ignition device mounted in the region of the preferred fuel outlet. The pore burner ~~according to the invention~~ of the disclosure functions without problem and reliably under a wide variety of reaction conditions just because of this not very demanding design expedient. It is also advantageous that no trade-offs need be made with respect to the compact design of the pore burners. It is of particular advantage that the spacing between the surface of the pore burner and the combustion chamber boundary can be kept very low. This could not be easily achieved with ordinary burner types, since increased flow velocities always accompany a reduction in spacing, which thus far has often led to the extinguishing of flames. In addition, a

persistently high degree of flame stability is achieved and flashback is essentially fully prevented.

On page 13, after line 3 please insert a heading as follows:

BRIEF DESCRIPTION OF THE DRAWINGS

The paragraphs beginning on page 13, line 3 have been changed as follows:

Additional features and advantages of the ~~invention~~ disclosure are apparent from the following description, in which preferred variants ~~of the invention~~ are explained in detail with reference to the schematic drawings. In the drawings:

Figure 1 shows a schematic layout of a cooking appliance according to the ~~invention~~ disclosure containing a pore burner;

Figure 2 shows a hollow cylindrical pore burner in cross section;

Figure 3 shows a schematic perspective view of a pore burner according to the ~~invention~~ disclosure;

Figure 4 shows a schematic cross-sectional drawing of the pore burner according to Figure 3; and

Figure 5 shows another schematic cross-sectional view of the pore burner according to Figure 3.

On page 13, after line 14 please insert a heading as follows:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The paragraphs beginning on page 13, line 15 have been changed as follows:

The cooking appliance 1 depicted in Figure 1 includes an internal space 2 with a pore burner 4 ~~according to the invention~~ to generate hot air. As an alternative or in addition, steam can also be generated with the pore burner 4 or an additional pore burner (not depicted). To monitor the burner function, each pore burner 4 has a sensor (not shown) in the form of an ionization current sensor as well as an ignition device (not shown). The pore burner 4 is supplied with combustion gas or a combustion gas mixture via a supply line 6 by means of a first gas fitting (not depicted). This gas fitting assumes the function of pressure control, amount adjustment and optionally gas filtering. The pore burner 4 is designed as a hollow cylinder and has a thread on one end that is integrated in one piece in the molded element forming the pore body (not depicted). The shape-stable molded element 7 present in this variant as a pressed wire mesh can be screwed directly to a base 8 via this thread so that a reliable connection with the supply line 6 is already guaranteed without requiring additional components, which also makes it possible to exchange different pore burners 4 or molded elements 7 with each other in simple and uncomplicated fashion.

Figure 2 is a schematic depiction of a pore burner 4' in cross section. The wall 10 of the hollow cylindrical-shape molded element 7' of pore burner 4' has irregularities 12 and 14 in the surface 16 of the molded element, which come down to different thickness of the molded element wall 10. In pore burners ~~according to the invention~~ configured in this way, the phenomenon of combustion-related, self-induced oscillations no longer regularly occurs. By designing the irregularities 12 and 14 of molded element 7' as grooves that can engage one in the other, larger-dimensioned pore burners can be created with these molded elements 7', which can be positioned one against the other in shape-mated fashion. The groove 12 of a first molded element 7' then engages in the groove 14 of a second molded element 7' whose free groove 12 can again be combined with the groove 14 of a third molded element 7' with shape mating.

Figure 3 is an alternative pore burner system 3' ~~according to the invention~~, containing a pore burner 4'' ~~according to the invention~~ with a burner tube 24, a feed tube 26 connected to it, as well as a flange 28 connected directly to the feed tube 26. The flange 28 has several screw holes 34 for mounting, for example, in a cooking space of a cooking appliance or in a steam generation unit of a cooking appliance. A

mount 36 for the ignition source 22 is also mounted on the flange 28. The baffle plate 100 extends into pore burner 4'', which is configured in the form of a hollow cylinder. This baffle plate 100 is arranged so that it supplies part of the gas/air mixture reaching the internal space of pore burner 4'' via the feed tube 26 and the burner tube 24 deliberately to a defined region of the inside wall of the pore burner 4''. For this purpose it is already sufficient, if the baffle plate 100 is sloped relative to the center axis of the hollow cylindrical pore burner 4'' in the direction toward the inside wall of this hollow cylinder. For example, an essentially rectangularly shaped baffle plate 100, shown in Figure 3, can extend obliquely into the internal space of the hollow cylinder. If the baffle plate 100 is also present in sections in the burner tube 24 or mounted there in sections, the gas/air mixture arriving via the feed tube is channeled in parts in timely fashion in the direction toward the desired region of the inside wall of the pore burner. In this manner ignition is possible in an early section of the pore burner body fully without problem. In a preferred variant the baffle plate 100 can also be arranged moveable or rotatable within the hollow cylinder. For example, during use of a high-energy gas/air mixture, its channeling is unnecessary, since ignition problems need not be reckoned with, for which reason it would work to align the baffle plate 100 parallel to the center axis of the hollow cylinder. Because of the proximity of the ignition source to the region on the outside of the pore burner 4'' in which a particularly large amount of gas/air mixture emerges, it is ensured by simple and reliable means that even a single ignition spark is sufficient to set combustion in motion. Naturally, in another variant, the ignition source 22 mounted on the holder 36 can naturally be rotatably arranged ~~rotatable~~ so that it is only brought to the outside of the pore burner 4'' in the case of ignition.

Figure 4 shows a section of the pore burner system 3' or the pore burner 4'' depicted in Figure 3. It is apparent here that the baffle plate 100 already begins in the burner tube 24 and extends into the internal space of the pore burner 4''. The baffle plate 100 is preferably fastened in the region of the burner tube 24. The gas/air mixture introduced by a feed tube 26 encounters the baffle plate 100 in the burner tube 24 and is deflected by it partially in the direction toward the inside wall region of the pore burner 4''.

Figure 5 is a schematic cross-sectional view of the pore burner system 3' or the pore burner 4'' according to Figure 3. According to it, the baffle plate 100 is ~~arranged~~ sloped in the same direction both in the burner tube 24 and in the pore

burner. For this purpose a uniform angle can be used, for example, in the range of 20° to 25°. As is apparent from Figures 4 and 5, the pore burner 4'' has a groove 18 incorporated in the pore burner material in the connection region with the burner tube, which is already sufficient to ensure reliable connection to the burner tube 24. It is likewise possible to provide a thread in the pore burner material in the region of the outer wall, which leads to a secure connection to a counter-thread applied to the burner tube 24.

~~Already with the~~ The depicted baffle plate 100 can guide a gas mixture ~~can be guided~~ accordingly so that a locally limited pressure increase occurs in the region of the inside of the pore burner present as a hollow element. This design is also advantageous to maintain a flame in a cold burner. If necessary, a blower is provided in order to introduce the gas mixture to the pore burner hollow element or an existing blower is equipped with increased power, since the pressure losses are generally increased by incorporation of a baffle plate.

~~The features of the invention disclosed in the previous description, in the drawings and in the claims can be essential both individually and in any combination for implementation of the invention in its different variants.~~